was doubtful. Another trial of the Hartnack No. 10 resolved the 13th band perfectly, — the 14th doubtfully.

English and American opticians name their objectives (*i. e.*, the lens or lenses placed next the object, that next the eye being the eye-piece), from their magnifying power, — thus a $\frac{1}{4}$ inch objective has the same power as a simple lens of $\frac{1}{4}$ inch focus. Continental European makers generally distinguish their instruments by numbers; the higher numbers indicating higher powers; but as each maker has his own system, the actual power of an instrument must be ascertained by trial. Instruments also often differ from their names, and they cannot generally be depended on. The theoretical power of a microscope is measured from an arbitrary standard of ten inches, — thus, a one inch is said to magnify ten diameters; a $\frac{1}{4}$ inch, forty diameters. If the standard is taken at five inches, as it is by some, then the "power" is but one half as much. The "power" of the *microscope* is that of the objective multiplied by that of the eye-piece; if the objective magnifies ten diameters, and the eye-piece ten, the result is one hundred diameters.

Angular aperture is the angle in the surface of the front lens, at which light will enter the objective, — the greater the angular aperture, the more light, and usually the greater *resolving* power.

An *amplifier* is an achromatic combination inserted in the compound body of the instrument to increase the "power" of the objective and eye-piece.

Immersion lenses have lately attracted great attention, though they were made by Amici many years since. The objective is immersed in water, — that is, there is a film of water between the front of the objective and the object, or the thin glass covering it. The effect is a great increase of light, and better definition.

REVIEWS.

The Animal Nature of Sponges.* — Many opinions have been expressed with regard to the animal nature of the sponge, which has been considered as a plant by most authors, but nothing of a reliable or definite nature had appeared before a paper by Mr. Carter in the Annals and Magazine of Natural History, for April, 1857. In this paper it was first shown that the organized layer of the sponge was made up of single-

*On the Spongiæ Ciliatæ as Infusoria Flagellata; or, Observations on the Structure, Animality, and Relationship of *Leucosolenia botryoides* Bowerbank. With two plates, and more than seventy-eight figures. By Professor H. James Clark, A. B., B. S. Memoirs of Boston Society of Natural History, June 20, 1866.

ciliated cells, which were supposed to be allied to Amœba, an animalcule, because they were seen to take in food apparently through the walls of the body, and not through any proper mouth. Professor Clark shows that *Leucosolenia botryoides* Bowerb. is an aggregation of new forms of Monads closely allied to *Monas termo* Ehren. The existence of a mouth at the base of the flagellum, a lash-like organ present in many infusoria, is demonstrated in all these forms, and all except Monas are described as possessing a hyaline calyx, or cup, surrounding the region of the mouth, like an inverted funnel. The single monads which compose the ciliated layer lining the internal channels of *Leucosolenia*, a common marine sponge, have a similar calyx, are monoflagellate (that is, provided with a single lash-like appendage), and probably have a mouth at the base of the flagellum, since they took in their food in the same manner as the *Monas termo*. The connection between Monas and its allied forms, with the higher Protozoa, or infusoria, such as Euglena, Dysteria, and Pleuronema, is shown by *Anthophysa Mulleri* which has two flagella, like the higher forms mentioned, but like Monas has no calyx, and grows in umbellate colonies like Codosiga. The direct relation anatomically and zoölogically of the sponge with these exceedingly active and beautiful forms is startling, and one sees in the great advance in the study of the Protozoa made by Professor Clark, that, after all, Ehrenberg's belief that these minute forms had a very highly complicated organization, is, like most opinions, not without a kernel of truth. — A. H.

The Progress of Zoölogy in 1866.* — Another volume of this invaluable year-book, which is simply indispensable to the working naturalist, has just been published. We hope it will meet with much encouragement among American zoölogists. In the words of the chief editor, "The object of the Record is to give, in an annual volume, reports on, abstracts of, and an index to, the various zoölogical publications which have appeared in the preceding year; to acquaint zoölogists with the progress of every branch of their science in all parts of the globe; and to form a repertory which will retain its value for the student of future years."

The scientific part of the zoölogical literature of 1864, to which vol. 1 forms a guide, amounts to more than 25,000 pages; that for 1865 amounts to not less than 35,000 pages; and that for 1866 to about 30,000 pages. In the literature for 1865, it is estimated that about 7,000 animals are described as new to science.

In running through the 649 pages of the last volume we glean the following items of interest. — Professor Lilljeborg states in his memoir on the Rodents that about 2,300 species of Mammalia are known, namely, about 700 *Rodents*, 500 *Chiroptera* (Bats), 250 *Ferœ* (including Insect-

*The Record of Zoological Literature. Edited by A. C. L. G. Gunther, M. D., 1864-'66. London, 1865-'67, 8vo, vol. 1, pp. 634; vol. 2, pp. 784; vol. 3, pp. 649. The Mammalia, Reptiles, and Fishes are reported on by Dr. Gunther; the Birds by Alfred Newton; the Insects by W. S. Dallas; the Crustacea by C. Spence Bate; the Worms, Radiates, and Molluscoida (Tunicates and Polyzoa), by E. Percival Wright; and the Mollusca by E. von Martens. The price of each volume is about $6.00 in gold. We shall be pleased to take orders for our subscribers.